

CLAIMS

1. A lithography mask blank used as a material for manufacturing a lithography mask and comprising at least one layer of a thin film having a required function and formed on a substrate, comprising:

5 a nitrogen-containing thin film as said thin film, and
 an ammonium ion production preventing layer for preventing production of ammonium ions, which is formed on said nitrogen-containing thin film or at least at a surface portion of said nitrogen-containing thin film and which is exposed on the surface of said lithography mask after said lithography mask is
10 manufactured.

2. A lithography mask blank according to claim 1, wherein:
 said ammonium ion production preventing layer is a thin film containing less nitrogen than said nitrogen-containing thin film.

3. A lithography mask blank according to claim 1, wherein:
15 said ammonium ion production preventing layer is formed by a heat treatment of said nitrogen-containing thin film.

4. A photomask, wherein:
 the photomask is manufactured using said lithography mask blank according to any of claims 1 to 3.

20 5. A halftone phase shift mask blank used as a material for manufacturing a halftone phase shift mask and comprising at least a light-semitransmissive film composed of one layer or multilayers, having a required transmittance and phase shift amount, and formed on a substrate, comprising:

 a nitrogen-containing thin film as a thin film forming said light-
25 semitransmissive film, and
 an ammonium ion production preventing layer for preventing production of ammonium ions, which is formed on said nitrogen-containing thin film or at least at a surface portion of said nitrogen-containing thin film and which is

exposed on the surface of said mask after said mask is manufactured.

6. A halftone phase shift mask blank according to claim 5, wherein:

said ammonium ion production preventing layer is a thin film containing less nitrogen than said nitrogen-containing thin film.

5 7. A halftone phase shift mask blank according to claim 6, wherein:

said nitrogen-containing thin film contains at least silicon and nitrogen

and

said ammonium ion production preventing layer contains at least silicon

and oxygen.

10 8. A halftone phase shift mask blank according to claim 5, wherein:

said ammonium ion production preventing layer is formed by a heat

treatment of said nitrogen-containing thin film.

9. A halftone phase shift mask, wherein:

said halftone phase shift mask is manufactured using said halftone

15 phase shift mask blank according to any of claims 5 to 8.